USER HISTORY INFORMATION GENERATION OF MULTIMEDIA DATA AND MANAGEMENT METHOD THEREOF

BACKGROUND OF THE INVENTION

1.   Field of the Invention

5   The present invention relates to an application of multimedia data, in particular to a method for generating user history information of multimedia data, and a method for managing the user history information which is capable of providing a user-oriented multimedia service.

10   2.   Description of the Prior Art

As multimedia consumption has rapidly increased and a movement for providing more user-oriented service has occurred, user-friendly services have been developed which reflect a user preference by making a system observe a usage pattern of the user.

In conventional technology, in supplying a user guide, a user adaptive interface was

15   provided by using use history information on how frequently the user checks a multimedia item. In other words, when a guide is provided as a tree structure, the usage history can shorten a path for finding a user requested part by indicating as a higher level a part frequently referenced by the user.

In addition, other conventional technology provides a user adaptive interface by

20   setting a function of each button as a user requested function. In particular, with the advent of digital broadcasting, additional functions have been introduced as very important elements. For example, there is a multimedia retrieval and display method which extracts

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user preference by using the usage history of the user, and performs multimedia retrieval and display using the same.

In addition, there is an intelligent display method which records a display operation of a user, such as a replay, a fast forward etc., and describes a user preference point by data segments using the same. For example, it is possible to display a certain segment frequently replayed slowly during a search by regarding the certain segment as an important segment.

In addition, in conventional technology, a user adaptable environment is provided by recording device information such as a user preference channel, and preference volume of each channel etc.

In another conventional technology in which a program guide is supplied, a method for providing a program guide focuses on a user preferred program genre for each user in order to avoid having to transmit huge amounts of data for a complete program guide. The preference information for a user preferred genre can be extracted by recording viewing data of the user.

In another conventional method, there is provided a system for automatically selecting a user-preferred program and recording it by using a multimedia viewing history of a user. In addition, there is a method for introducing a smart card in order to provide user adaptive services as opposed to server-based or device-based services. The method using a smart card is capable of providing a consistent user-adaptive service without being influenced by a server or a device by recording user preference information on the smart card.

Most of the above-mentioned functions are performed on the basis of recorded history about multimedia data usage of the user. In other words, the preference information can be extracted by recording the multimedia data usage of the user, and recording the pattern or habits as a numerical value.

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In order to record the usage pattern of the user as the numerical value, full history from the usage start time point to the present time has to be reflected[[,]]; however, there is a limitation to describing the user history for a certain time period with a certain numerical value.

5   In addition, sequential history can be used in case of need; however, consecutive recording of sequential usage operation should be stored as a list format.

There is a history method, such as a method provided by Netscape, in the prior art for storing consecutive recording of sequential usage operation as a list format. The history method, such as the method provided by Netscape, can store the usage record by describing used multimedia data, namely, an address of a document. However, the history information in accordance with conventional technology must record not only position information of the used multimedia data but also additional feature information, such as meta information of the pertinent data, etc.

For example, in the case of a record of a motion picture, not only a position or a title of the relevant motion picture but also various feature information, such as a genre, an actor, a director, etc., of the motion picture must be recorded together. In that case, the user preference information can be extracted.

However, when all of this information is recorded on the history list, because there is space waste due to duplicate information, it is difficult to manage all of the information in a storage having limited capacity, such as a smart card. In addition, because data volume corresponding to one record is big, the efficiency of data access speed is lowered.

Accordingly, in next generation multimedia application considering feature information, such as the meta information, in addition to multimedia data as important elements, a data structure for efficiently managing all of the information provided with a history, a generation method thereof, and a management method thereof are required.

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SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a method for generating a user history information of multimedia data and a method for managing the user history information that substantially obviate one or more of the problems due to limitations and disadvantages of the related art.

To solve the above problems, the object of the present invention is to provide a method for generating user history information of multimedia data and a method for managing the user history information, which is capable of efficiently describing feature information of multimedia data used by a user in limited space.

The other object of the present invention is to provide a method for generating user profile information, which is capable of providing a user-oriented multimedia service by adapting the method for generating user history information of multimedia data and the method for generating user history information to user preference information.

In order to achieve the objects of the present invention, the method for generating user history information of multimedia data in accordance with the present invention comprises processes of: generating usage summary information including feature information of the multimedia data and feature table including usage frequency for the feature information; and generating a usage history list including feature code for linking the feature information.

In order to achieve the objects of the present invention, the method for managing user history information of multimedia data in accordance with the present invention comprises processes of: checking whether the feature information corresponding to an event has already been recorded in the usage summary information item when the event to be included in the user history information occurs; recording the relevant feature information in the usage summary information item when the feature information has not been recorded on

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the usage summary information item; and recording link information about the feature information and information corresponding to the event in a usage history item to be added to the user history list.

In order to achieve the objects of the present invention, the method for generating user profile information on the basis of the method for generating user history information of multimedia data and the method for managing the user history information in accordance with the present invention for reflecting user preference of multimedia data comprises processes of: generating user-designated history information compulsorily or automatically designated by need of a user; generating conditional usage history information for managing a user history satisfying only a certain condition; and generating unconditional usage history information for continually reflecting a user history from the time of generation of the user history.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG.1 illustrates a method for generating user history information in accordance with the embodiment of the present invention.

FIG.2 illustrates a method for generating user history information in accordance with the other embodiment of the present invention.

FIG.3 is a flow chart illustrating the embodiment of a history item adding process in the method for managing user history information in accordance with the present invention.

FIG.4 is a flow chart illustrating the embodiment of a history item deleting process in the method for managing user history information in accordance with the present invention.

FIG.5 illustrates a hierarchical structure of feature information in the method for managing user history information in accordance with the present invention.

FIG.6 is a block diagram illustrating a method for generating user profile information in accordance with the present invention.

FIG.7 illustrates a method for generating user history information in accordance with the other embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, the embodiments in accordance with the present invention will now be described in detail with reference to accompanying FIG.1 ~ 7.

In user history information of multimedia data, a conditional history for managing

10 only history satisfying a certain condition, such as a certain period or recent N number of event, etc., is very important information for constructing user preference. For example, in order to extract recent pattern information of a user, a history having a certain period condition has to be managed, and a recent preference pattern of the user can be described from the history.

15 In order to extract the user preference information from the history, feature information of multimedia data used for the preference has to be described (recorded) in the history information. In other words, besides the multimedia data itself, information describing the content or feature of the multimedia data has to be described (recorded). Because substantial added information exists in each data, it is difficult to record it for each

20 history occurrence.

Accordingly, a method for describing and managing the feature information with a history in accordance with a certain condition is required. Therefore, the present invention provides a method for generating user history information and a method for managing the user history information for updating and maintaining the user history, which constructs the

25 usage summary information by recording the usage frequency of feature information on the

multimedia data used by the user in a feature table, and constructs link (address) information corresponding to the feature table of the usage summary information in the usage history list, thereby efficiently recording the feature information of the multimedia data used in the conditional history and adapting it to the user preference information. In addition, the present invention provides a method for generating user profile information, which reflects the user preference by generating the above-mentioned conditional history in the user history information of the multimedia data.

FIG.1 illustrates the method for generating user history information in accordance with the embodiment of the present invention. As depicted in FIG.1, the user history information for managing the conditional user history maintained for a certain period or certain condition is constructed by generating a usage summary information 11 and a usage history list 10. The usage summary information 11 is constructed with feature information 15 of multimedia data, and feature tables 14 including usage count 16 about each feature information 15.

The usage history list 10 comprises feature codes 13 for linking the feature information corresponding to the usage summary information 11, and history items (record) 10A including usage time information 12 recording usage time and date item of the feature information 15 corresponding to the feature codes 13. The user history information in accordance with the embodiment of the present invention will now be described in detail.

First, the usage history list 10 leaves (includes) usage record whenever the user uses the multimedia data as a history of Netscape. Herein, the "leaves the usage record" means a usage event of the multimedia data by the user occurs. The record included in the usage history list 10 is not maintained eternally but can be deleted after the certain period or by the certain condition.

For example, a certain condition for deleting the pertinent history item 10A can be presented by judging deletion from the first history item by comparing the number of the history item 10A of the usage history list 10 with a certain set reference number of history item.

5   In another example, when a usage record of the user is deleted after a certain period, a usage record of the user passed a certain time period can be deleted from the usage history list 10 by the usage time information 12. Herein, the usage time information 12 is dependent information on the multimedia data used in each history item 10A. It can be time (date) information when the multimedia data is used or a title of the data or a position (URL) of

10   the data or a combination.

In another example, the usage record (information) of the user can be maintained on the basis of the number of the history item (record) 10A included in the usage history list 10. When the number of the history item (record) 10A included in the usage history list 10 is bigger than a certain threshold value as a certain reference value, it is possible to delete from

15   the first recorded history item 10A. In other words, when the content (history item) recorded on the usage history list 10 is bigger than the certain threshold value as the certain reference value, the first recorded usage content (history item) is deleted.

As described above, not all feature information 15 of the data used for each record is recorded on the each history item (record) 10A included in the usage history 10, which is

20   altered variably. Only the address (or reference) is recorded on the feature code 13 in order to describe where the content corresponding to the feature information 15 of the data is placed in the feature table 14 in the usage summary information 11.

For example, when the multimedia data used by the user includes the feature information 15 having content, such as a melodrama as a genre, Bruce as a director, and Jody

25   as the leading part, the feature information 15 is not recorded in the usage history list 10.

Only the address corresponding to the feature information 15 is recorded on the feature code 13 item of the usage history list 10.

In addition, when the usage record of the feature data is added to the usage history list 10, the address of the feature information 15, namely, the feature code 13, is added (recorded) together, at the same time the usage count of the items of the feature information 15 increase. On the contrary, when the history item 10A is deleted from the usage history list 10 by the certain condition, the usage count 16 of the items of each feature information 15 decrease. In order to search the feature information 15 recorded on the usage history list 10 for decreasing the usage count 16 of the history items 10A, the usage count 16 of the feature information 15 is decreased by referencing the feature code 13.

By using the above-described usage history information, the conditional usage history can be managed efficiently without duplication for not only simple usage information but also detailed feature information. In addition, it is possible to perform the user basis service by using the user history information in accordance with the embodiment of the present invention to determine recent usage habit or recent preference of the user.

Hereinafter, a method for generating the user history information according to another embodiment of the present invention, which generates data original information more to the usage history list 10, will now be described in detail with reference to accompanying FIG.2.

FIG.2 illustrates a method for generating user history information in accordance with another embodiment of the present invention. In other words, the data original information 20 is generated more to the usage history list 10 in the method for generating user history information of FIG.1, the same constructions (10, 10A, 11, 12, 13, 14, 15, 16) with FIG.1 will have same reference numerals, and the duplicated description is omitted.

As depicted in FIG.2, the user history information in accordance with the other embodiment of the present invention generates (constructs) the data original information, such as the title of the data, more to the usage history list 10[[,]].The user history information in accordance with the other embodiment of the present invention will now be described in detail.

First, the data original information 20, such as the title of the multimedia data, corresponding to the feature information 15, such as the genre, is recorded on the usage history list 10. In other words, when the feature information 15, such as the genre, is managed in the usage history list 10, because it is duplicated in recording and the volume of the data is vast, it is difficult to manage the system. However, in the data original information 20, such as the title of the data, it is not duplicated in recording or the volume of the data is small. Because the volume of the data is not decreased and approach has to be performed by using the link, it is not efficient in processing time aspect when it is recorded on the usage summary information 11. Accordingly, the data original information is recorded on the usage history list 10. Herein, a file of the pertinent multimedia data or a URL of the position of the feature information (description) 15 is included in the data original information 20.

Hereinafter, a method for managing the usage history information of the multimedia data by using the above-described user history information will now be described in detail with reference to accompanying FIGS. 3 and 4.

FIG.3 is a flow chart illustrating an embodiment of a history item adding process in a method for managing user history information in accordance with the present invention. It will now be described in detail.

First, it is judged whether the multimedia data is used or not. In other words, it is judged whether an event to be included in the user history information occurs, in step S30.

When the event to be included in the user history information occurs, one empty history item (record) 10A is added to the usage history list 10, in step S31.

Time information (usage time and usage date) of the pertinent data is recorded on the usage time information 12 item of the added empty history item (record) 10A, in step S32. After that, the title of the file of the multimedia data used by the user or the URL of the position of the feature information 15 is recorded on the data original information 20 of the added empty record (record item) 10A, in step S33. And, the address corresponding to the feature information 15 described in the feature table 14 in the usage summary information 11 is recorded on the feature code 13 of the usage history list 10, in step S34, and the usage count 16 of the pertinent feature information 15 is increased, in step S35.

In other words, only link information (address) corresponding to the feature information 15 of the usage summary information 11 is coded and is recorded on the feature code 13 item of the usage history list 10. Herein, the usage count 16 increases whenever the user uses the pertinent feature information 15, in step S35. For example, if the feature information 15 requested by the user is used three times, the usage count 16 increases as many as 3.

FIG. 4 is a flow chart illustrating an embodiment of a history item deleting process in a method for managing user history information in accordance with the present invention. In other words, FIG. 4 illustrates the process for deleting the history item 10A from the usage history list 10 when the use record of the user does not correspond to the certain period or certain condition. The process will now be described below.

Herein, when the history item 10A of the usage history list 10 is deleted, it is assumed that the history item passed a month is deleted.

First, after setting a certain condition or certain time, it is judged whether the history item (record) 10A of the usage history information exists (occurs) in accordance with the set

certain condition or certain period. When the history item (record) 10A exists (occurs), in step S40, it is judged whether the history item 10A is recorded before one month, in step S41.

When the history item (record) occurred before the one month, in step S40, the usage count 16 of each feature information 15 of the corresponding usage summary information 11 decreases 1 by 1 by using the pertinent address of the feature code 13 of the use history item (record) 10A. On the contrary, when the history item (record) 10A occurred before the one month, in step S40, in other words, when the history item (record) 10A to be deleted from the usage history list 10A is determined, the history item (record) 10A is deleted from the usage history list 10A, in step S43.

Herein, the deletion of the history item (record) 10A is judged by comparing sequentially from the first of the usage history list 10, namely, the oldest history item (record) 10A with the set period (the certain period). In other words, the judging process for judging whether the history item 10A is deleted judges the deletion sequentially from the first history item by setting the certain condition as a certain period and checking the period for each history item. In addition, the deletion is judged from the superior first history item by comparing the number of the history item 10A of the usage history list 10 with a certain set reference number.

After that, it is judged whether the next usage history item (record) 10A exists (occurs), in step S44. When the next usage history record item occurs, the process after the judging process, in step S41 judges whether the usage history record item is recorded before one month are performed repeatedly, in step S45.

Hereinafter, a method for recording (describing) the address corresponding to the feature information 15 in the usage summary information 11 will now be described in detail with reference to accompanying FIG.5.

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FIG. 5 illustrates a hierarchical structure of feature information in the method for managing user history information in accordance with the present invention.

In other words, in generation of the user history information, a method for designating the address corresponding to the feature information 15 of the usage summary information 11 of the hierarchical structure of the feature information 15 and the feature code 13 will be described below.

First, the content of the usage summary information 11 can be described as a tree structure when it is described logically. A number can be provided to the subordinate nodes of each node downwardly from a root 50 to its leaf. In addition, when the number is provided to the subordinate nodes centering around all nodes excluding the leaf, an address for describing the certain leaf can be designated as a consecutive node number connecting a path from the root 50 to the leaf.

For example, the address of the leaf corresponding to an action node 53 is '000'. In other words, a number within ( ) in FIG.5 is the address of the each node provided as the above-mentioned method.

The hierarchical table structure used in the usage summary information 11 is constructed with detailed items in the comprehensive item corresponding to the feature information. It is not limited by the embodiments of the present invention, but rather it can be used variously in accordance with each user.

Meanwhile, when the usage count 16 of the leaf increases or decreases, the superior node structure connected to the leaf also can automatically increase or decrease the usage count 16. In other words, the usage count 122 of the action (the lowest level) of the leaf No. 53 increases or decreases in accordance with the usage event occurrence of the user through the process of FIG.3, the usage count 16 of the genre 52, and movie 51 as the superior node (superior level) of the pertinent node increases or decreases.

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Herein, the increase of the automatic usage count 16 of the superior node can be different according to a required structure. For example, such as the genre node 52, all nodes placed on a level 2 in the hierarchical table (tree) cannot have the usage count 16. In this case, all nodes placed on the level 2 are used only for the hierarchical structure of the node, and are not used for the preference information itself.

Hereinafter, a method for generating user profile information for reflecting the user preference by using the user history information in accordance with embodiments of the present invention will now be described in detail with reference to accompanying FIG. 6.

FIG. 6 is a block diagram illustrating a method for generating user profile information in accordance with the present invention. As depicted in Fig. 6, the user profile information 60 comprises unconditional history information 63, conditional user history information 62, and user-designated history information 61. It will now be described in detail below.

First, the unconditional history information 63 is the part for recording the user preference item 64 by continually reflecting the usage record of the user from the history occurrence time point by the user. The feature information 15 and the preference information 65 corresponding to the feature information 15 as the numerical value are recorded in the preference item 64. The preference 65 for each preference item 64 can be described as a numerical value. The numerical value of the preference 65 is a stored value after being updated continually whenever the data usage of the user occurs.

As described above, the conditional user history information 62 manages only the history satisfying the certain condition. The conditional user history information is divided into the feature information 15 of the pertinent information, the usage summary information 11 including the user frequency about the relevant feature information, and the user history list 10 including the feature code 13 for reading (linking) the feature information 15.

The user-designated history information 61 is the history compulsorily designated by the user in case of need or the history automatically designated by the system because of the need possibility of the user. It means the data which can be deleted by a certain order of the user.

5   For example, the user can compulsorily designate the multimedia data such as the position of the interrupted multimedia data, interruption time of the multimedia data, service position of the multimedia data, etc., in order to watch later the multimedia data which is interrupted during the audition. Or the system can store information needed for the re-service about the interrupted multimedia data by automatically designating it.

10   In order to update or extract the user preference information by using the user history information, the relevant feature information is called by using the link information of the data recorded on the usage history list 10. A method for extracting or updating the pertinent preference item values by using the link information will now be described in detail with reference to accompanying FIG. 7.

15   FIG. 7 illustrates a method for generating user history information in accordance with another embodiment of the present invention. In the method for generating user history information of FIGS. 1 and 2, FIG. 7 generates link information 70 more to the usage history list 10, constructions same with the constructions of FIGS. 1 and 2 are described with same reference numerals, and duplicated descriptions are omitted.

20   As depicted in FIG. 7, the user history information in accordance with the other embodiment of the present invention has the construction adding the link information 70 for receiving the relevant feature information to the usage history list 10. It will now be described in detail below.

Only the user usage history list 10 is recorded on the conditional user history information 62, and is managed. Only the multimedia used time information 12 and the link information 70 about the used multimedia data are recorded on the usage history list 10.

In addition, the data original information 20, such as the title of the relevant data, can be included in the usage history list 10. The URL etc. can be used for the link information 70 of the data in order to connect the feature information 15 of the used data.

Although the data feature information is not recorded on the used history information, the relevant information can be called by using the link information 70. In other words, when the system updates or extracts the user preference information by using the user history information, the relevant feature information 15 can be called by using the link information 70 of the data included in the usage history list 10. In addition, the relevant preference item values can be updated or extracted by using the link information 70. Accordingly, the user history information in accordance with the other embodiment of the present invention can have less data volume than the embodiment of the present invention, and needs to manage only the usage history list 10.

As described above, in providing of the user-oriented service using the user history, the present invention is capable of efficiently extracting the user preference information by effectively managing the history information in the limited space. In addition, the present invention can perform the management of the user preference per period by extracting the user preference information by the certain period and certain condition, without being limited by the conventional method of extracting collective user preference information.

In addition, the present invention can reflect the feature information of various and huge multimedia data to the user history. Accordingly, the present invention can provide a user history management solution applicable to the next generation multimedia data environments, which meta information become more important and a standardization works

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about it are expected to be progressed. In addition, the present invention can efficiently control lots of data in the user history management method, such as the smart card, which is movable and is in small space.